-CLAIMS

1. An optical cavity structure, comprising:

an input port for receiving input optical signals from a first waveguide;

an interconnecting structure that receives said input optical signals and interconnects said first waveguide to a second waveguide, said interconnecting structure includes at least four straight edges that are orthogonal and of a finite width; and

an output port coupled to said interconnecting structure for providing said second waveguide with said input optical signals.

2. The optical cavity structure of claim 1, wherein the interconnecting structure reflects said input optical signals at a 45 degree angle.

3. The optical cavity structure of claim 2, wherein the interconnecting structure interconnects said first and second waveguides at 90 degrees.

4. The optical cavity structure of claim 3, wherein said interconnecting structure is a five-sided polygon.

5. The optical cavity structure of claim 4, wherein the interconnecting structure includes a fifth side that is aligned at an angles 135 degrees from both of its respective sides.

6. The optical cavity structure of claim 5, wherein said first waveguide and second waveguide are polySi waveguides.

7. The optical cavity structure of claim 5, wherein said first waveguide and second waveguide are SOI waveguides.

8. The optical cavity structure of claim 7, wherein said interconnecting structure is etched using anisotropic etching.

9. An optical splitter device, comprising

an input port for receiving input optical signals from an input waveguide; and

a splitting structure that receives said input optical signals and split said input optical signals into at least two separate signals that are directed to at least two output waveguides, said splitting structure includes at least two separate optical cavities connected to their sides, wherein each of said optical cavities includes at least four straight edge sides that are orthogonal with a finite width.

10. The method of claim 9, wherein said splitting structure is a T-shaped structure.

11. The optical splitter device of claim 10, wherein said first waveguide and said at least two output waveguides are polySi waveguides.

12. The optical splitter device of claim 10, said first waveguide and said at least two output waveguides are SOI waveguides.

13. The optical splitter device of claim 10, wherein said optical cavities are etched using anisotropic etching.

14. The optical splitter device of claim 14, wherein the SOI waveguides have a silicon core

15. The optical splitter device of claim 14, wherein the SOI waveguides have cladding of silica and top cladding of air.

16. The optical splitter device of claim 13, wherein the polySi waveguides have a silicon core

17. The optical splitter device of claim 16, wherein the polySi waveguides have cladding of silica and top cladding of air.

18. The optical splitter device of claim 10, wherein the splitting structure is Y-shaped.

19. The optical splitter device of claim 18, wherein said at least two optical cavities form a seven sided polygon.

20. The optical splitter device of claim 19, wherein said seven sided polygon includes five straight edge sides that are orthogonal.

21. The optical splitter device of claim 20, wherein the seven sided polygon includes two sides that are aligned at angles of 135 degrees and 270 degrees with their respective adjacent sides.

22. The optical splitter device of claim 21, wherein said first waveguide and said at least two output waveguides are polySi waveguides.

23. The optical splitter device of claim 21, said first waveguide and said at least two output waveguides are SOI waveguides.

24. The optical splitter device of claim 21, wherein said optical cavities are etched using anisotropic etching.

25. The optical splitter device of claim 23, wherein the SOI waveguides have a silicon core

26. The optical splitter device of claim 25, wherein the SOI waveguides have cladding of silica and top cladding of air.

27. The optical splitter device of claim 22, wherein the polySi waveguides have a silicon core

28. The optical splitter device of claim 27, wherein the polySi waveguides have cladding of silica and top cladding of air.

29. An optical resonator, comprising:

a plurality of straight waveguides; and

a plurality of interconnecting elements for interconnecting said plurality of straight waveguides to form said optical resonator, wherein said interconnecting elements include at least four straight edges that are orthogonal and of a finite width.

30. The optical cavity structure of claim 29, wherein said interconnecting elements are five-sided polygons.

31. The optical cavity structure of claim 30, wherein the five-sided polygons each include a fifth side that is aligned at an angles 135 degrees from both of its respective sides.

32. The optical cavity structure of claim 31, wherein said plurality of waveguides are polySi waveguides.

33. The optical cavity structure of claim 31, wherein said said plurality of waveguides are SOI waveguides.

34. The optical cavity structure of claim 33, wherein said interconnecting elements are etched using anisotropic etching.